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22 January 1957

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Dear [redacted]

The intent of this letter is to summarize the activities and plans of the Low Altitude Project Tasks "A" through "G" for the months of November and December, 1956.

Task "Able" - Miscellaneous

The [redacted] has informed us that the [redacted] hydrogen generator which they are repairing will be ready for return to [redacted] on January 15, 1957. [redacted] personnel will drive the vehicle back to [redacted]

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No other work or charges have taken place under this task during November since it was unofficially closed down. Under Task "Able" we plan to propose the writing of a balloon manual. In essence, this manual would give the newcomer the complete story on the balloon technique including manned flight. It would answer all the basic questions and act as a general textbook on ballooning.

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Two step-out flight tests were conducted in December under the supervision of [redacted]. The first flight was shroud launched successfully in a 25 knot wind using two 28-foot parachutes as brakes. The free lift was approximately 227% and the two chutes held the rate of ascent down to a maximum of 1469 feet per minute. The second flight was vertically launched and had the same free lift but used only one chute. This chute failed to open until the balloon had shot up to approximately 1500 feet. It then opened and the maximum rate of ascent was held to 1794 feet per minute. Both balloons were Model 302P's and were approximately four years old. Time-altitude curves for each flight are being plotted and will be sent to [redacted] in early January.

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Task "Baker" - Hot Air ProgramField Operations

Two tethered inflations were performed on November 8, 1956, at the Stratobowl, Rapid City, South Dakota, just after the Ross-Lewis flight. This location was chosen for its excellent low wind velocity conditions. An instrumented and modified "301C" balloon was inflated in approximately twenty minutes, however during this time the concentration of heat at the base of the balloon became excessive resulting in melted polyethylene load tapes and nylon load lines. This melting occurred at several locations adjacent to the load ring necessitating field repairs.

Following repair of the load tapes and lines, the balloon was reinflated and remained in an upright tethered position for approximately one and a half hours. Five complete readings were obtained from the poly skin mounted Veco thermistors. However, two thermistors were not functioning and readings were not obtained at the base of the balloon and at one of four locations on the equator. A gross lift of 135 pounds was obtained. This amount of lift was just sufficient to balance the weight of the balloon and the complete heater unit.

Design Revisions

As a result of a meeting of [redacted] held on the 12th of November 1956, it was resolved that the entire "Hot Air" system was to be redesigned for the purpose of weight reduction, improved heat insulation and ease of handling during inflation and flight. A toroidal fiberglass fuel tank of 8.1 gallons capacity will be used in conjunction with a three ring concentric type burner having 70 individual propane burners with a maximum capacity of 10,000 BTU/hr. each. An inner air duct of aluminum and a concentric outer air duct of fiberglass with an air space between is incorporated to eliminate the melting of the lower balloon material and load tapes. A load ring fabricated from aluminum tubing will be attached directly to the balloon load tapes and will fit into attachments on the outside diameter of the fuel tank for support of the integral fuel supply and burner unit. The pilot will be cradled below the load ring on an aluminum tubing J-bar support terminating in a formed fiberglass seat. The control and instrument console will be inclined, slightly forward of and overhead of the pilot to facilitate operation of the heater unit.

Initial testing of this new unit is expected to take place during the latter part of January, 1957.

Task "Charlie" - Target Drops

Due to the Stratobowl flight and the effort required for the Task "Easy" Florida flights, little shop work could be done for preparation of the second

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target drop flight during November. In December, the main 20-foot launcher was completed and tested by firing all twelve bins. A new 6-foot launcher was designed and constructed to be mounted midway between the main launcher and the gondola. Its purpose is to be used in case the targets dropped from the main launcher float out of range of timing them from the gondola. If the main launcher experiment is successful, drops will still be made from the small one to gain additional data. The flight plan and general instructions for the second flight were prepared and distributed to those concerned.

Four days were spent again at [] basketball arena in completing the hangar studies. Aspect ratios of 1.25, 1.50, and 1.75 were tested on the four lengths and ten paper densities that had been previously tested. Accurate graphs of time down vs. aspect ratio were drawn up again and this gives a complete picture of the 10 aspect ratios and 320 rectangular samples tested at ground level. A formal report is being prepared on the hangar studies. This report will include analyses of rectangles, shapes, folded edge samples, the tethered balloon drops conducted in the Stratobowl, and the altitude chamber tests at NACA, Cleveland, Ohio.

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Task "Dog"

All work on this task has been completed. (See [] Report No. B-1018)

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Task "Easy"

All preparations for the Florida flight were completed and checked during November. During early December, flights 2008 and 2009 were very successfully flown from N.A.S., Pensacola, Florida. Remaining task equipment was returned to [] for storage. Parts were ordered and received to explosion-proof the hydrogen valve, but no authority to proceed with development was received. A final report on this task will be submitted to your office in January, 1957.

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Task "Fox" - Medium Altitude Flight System

All work on this task has been completed. (See [] Report Nos. 1589 and B-1016)

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Task "George" - Modernizing Ten Balloons

All M-3 valves were made available for the conversion of the ten balloons. During December, two balloons borrowed from this task for the step-out tests conducted by [] were replaced with new balloons. Your office authorized a two to three week delay so that overseas packaging could be employed on the ten units. This task is expected to be completed by February 15, 1957.

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Task "Hotel" - Foreign-Built Target Release Systems

Several sketch designs were made for the two new target systems. The

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two most promising ideas are:

1. A bin arrangement using slanted shelves to hold the targets in which a motor-driven cable across the shelf openings is pulled out to gradually release the targets. Bundles can also be released this way.
2. A system in which a razor knife is drawn along a guide track to release bundles tied to it.

An undeveloped bin system of Idea "1" above has been made and works very well. Little further development will be required. An engineer [] has been assigned to study foreign materials available for the construction of these systems and also to design the balloon and to direct the task in general. While the deadline set for initial flights and preliminary completion of this task is February 1, it is expected that the work will be successfully carried out in the time allowed.

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Task "Item" - New Task Dog Balloon

Your office has proposed establishment of this task for \$15,000 and has indicated that the highly successful Task Dog balloon will undergo general redesign to the following extent:

1. Redesign of the inflation tube for minimum inflation time, i.e. maximum helium input rate.
2. Redesign of duct (unspecified)
3. Redesign of rip paneling by having instead two panels rip out a large portion of the lower envelope upon impact in order to leave only 100-200 lbs. free lift after destruction.
4. Increase the total volume by going to fourteen gores possibly.

Our balloon production department will proceed with these new requirements as soon as they are more completely defined in their next meeting with []

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Project Financial Status

A new extended proposal for additional funds on this project was submitted to your office in December covering funds required for each task starting December 9, 1956.

This proposal requested a total of \$191,000 including G and A and fixed fee. The new scope was quite broad, especially on Task "Charlie", and we expect that most of the tasks will be trimmed down pending your approval.

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